

## CLAIMS

1. A method of forming a bidirectional line switch ring (BLSR) using a pair of integrated circuit (IC) digital communication relay devices, the method comprising:

5 receiving bidirectional communications;  
for each relay device, selecting an input path to accept the received communications; and  
for each relay device, selecting an output path to supply bidirectional communications.

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2. The method of claim 1 further comprising:  
selecting a mode of operation; and  
selectively connecting the default and duplex input paths, for each relay device, in response to selecting the mode of operation.

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3. The method of claim 2 further comprising:  
decoding communications in response to the selecting of an input path.

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4. The method of claim 2 further comprising:  
encoding communications in response to selecting an input path.

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5. The method of claim 2 further comprising:  
selecting a first mode of operation;  
for each relay device, accepting communications on a default  
input;

5 decoding the communications;  
encoding the communications; and  
supplying the encoded communications at a default output.

6. The method of claim 2 further comprising:  
10 selecting a second mode of operation;  
for each relay device, accepting communications on a duplex  
input;

decoding the communications;  
encoding the communications; and  
15 supplying the encoded communications at a default output.

7. The method of claim 6 further comprising:  
for each relay device, connecting the default input to a duplex  
output;

20 connecting the duplex input of a first device to the duplex  
output of a second device; and

connecting the duplex input of the second device to the  
duplex output of the first device.

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8. A method of forming a bidirectional line switch ring (BLSR) using a pair of integrated circuit (IC) digital communication relay devices, the method comprising:

- 5 receiving a first communication from a first node;  
in a first mode of operation, supplying the first communication to a second node; and  
in a second mode of operation, supplying the first communication to the first node.

- 10 9. The method of claim 8 further comprising:  
receiving a second communication from the second node;  
in the first mode of operation, supplying the second communication to the first node; and  
in the second mode of operation, supplying the second  
15 communication to the second node.

10. The method of claim 9 further comprising:  
selectively decoding the first communication; and  
selectively encoding the first communication.

- 20 11. The method of claim 10 further comprising:  
selectively decoding the second communication; and  
selectively encoding the second communication.

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12. A bidirectional line switch ring (BLSR) system using a pair of integrated circuit (IC) relay devices, the system comprising:

a first relay including:

an input switch having a default input and a  
5 duplex input to receive communications, a control port to accept  
switch commands, and an output to supply the selected  
communications;

a default output; and

a duplex output connected to the default input;

10 and

a second relay including:

an input switch having a default input and a  
duplex input to receive communications, a control port to accept  
switch commands, and an output to supply the selected  
15 communications;

a default output; and

a duplex output connected to the default input.

13. The system of claim 12 in which the communications  
20 are organized in a digital frame structure including forward error  
correction (FEC);

wherein the first relay further includes:

a decoder having a input connected to the input  
switch output, the decoder supplying decoded and corrected  
25 communications at a decoder output.

wherein the second relay further includes:

a decoder having a input connected to the input switch output, the decoder supplying decoded and corrected communications at a decoder output.

5                   14.    The system of claim 13 wherein the first relay further includes:

an encoder having an input connected to the decoder output, the encoder supplying encoded communications at an output connected to the first relay default output;

10                   wherein the second relay further includes:

an encoder having an input connected to the decoder output, the encoder supplying encoded communications at an output connected to the second relay default output.

15                   15.    The system of claim 14 wherein the duplex output of the first relay is connected to the duplex input of the second relay; and wherein the duplex output of the second relay is connected to the duplex input of the first relay.

20                   16.    The system of claim 15 in which a first mode of operation is selected;

wherein the first relay input switch control port accepts a command to select the default input, and wherein the first relay decodes, encodes, and supplies communications received on the input switch default input to the default output; and

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wherein the second relay input switch control port accepts a command to select the default input, and wherein the second relay decodes, encodes, and supplies communications received on the input switch default input to the default output.

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17. The system of claim 15 in which a second mode of operation is selected;

wherein the first relay input switch control port accepts a command to select the duplex input, wherein the first relay decodes and encodes the communications, and wherein the first relay supplies communications received on the input switch duplex input at the default output; and

wherein the second relay input switch control port accepts a command to select the duplex input, wherein the second relay decodes and encodes the communications, and wherein the second relay supplies communications received on the input switch duplex input at the default output.

18. The system of claim 17 wherein the first relay default input accepts communications, and supplies the communications at the duplex output; and

wherein the second relay input switch default input accepts communications, and supplies the communications at the duplex output.